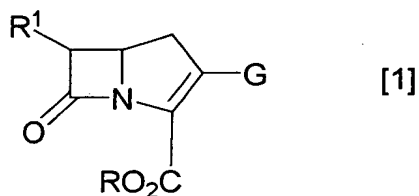


CLAIMS

1. A carbapenem compound represented by the following formula [1],

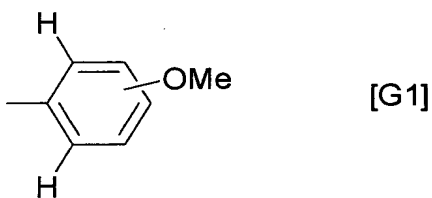


5 wherein R¹ is C₁-C₃ alkyl group or C₁-C₃ alkyl group substituted by hydroxy group,

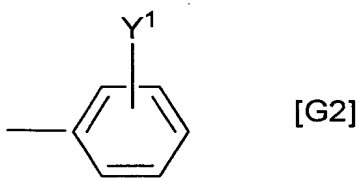
R is hydrogen atom or a group which reproduces carboxyl group by hydrolysis in vivo, and

G is a group represented by

10 the formula G1:



the formula G2:

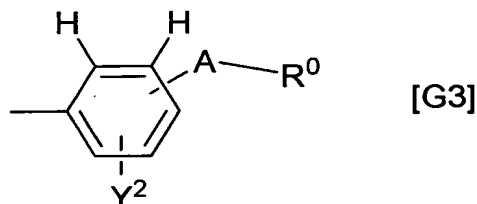


15 wherein Y¹ is C₁-C₄ alkyl, C₂-C₄ alkoxy, -(CH₂)_{ma}-O-CH₃ (in which ma is an integer of 1~3), -O-(CH₂)_{ma}-O-(CH₂)_{mb}-CH₃ (in which ma is the same as defined above, mb is an integer of 0~3), trifluoromethoxy, halogen atom, cyano or -SO₂NR²R³ (in which R² and R³ are independently hydrogen atom, optionally substituted lower alkyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted aralkyl, or

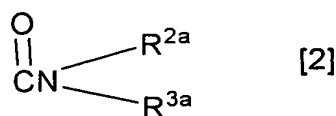
20 optionally substituted heteroarylalkyl, or R² and R³ may be taken together with the nitrogen atom to form a 3 to 7 membered hetero ring which may

be substituted.),

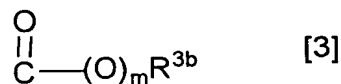
or the formula G3:



wherein A is $-(CH_2)_r-$ (in which r is an integer of 1~3), $-(CH_2)_s-O-$ (CH₂)_t- (in which s and t are independently is an integer of 0~3), $-O-(CH_2)_r-$ O-(CH₂)_s- (in which r and s are the same as defined above), $-(CH_2)_s-NR^a-$ (CH₂)_t- (in which, s and t are the same as defined above, R^a is hydrogen atom, protective group of amino group or optionally substituted C₁-C₆ alkyl), R⁰ is hydrogen atom, the formula [2]:



wherein R^{2a} and R^{3a} are independently (i) hydrogen atom, (ii) optionally substituted C₁-C₆ alkyl, (iii) optionally substituted C₃-C₇ cycloalkyl, (iv) optionally substituted aryl, (v) optionally substituted heteroaryl, (vi) optionally substituted aralkyl, (vii) optionally substituted heteroarylalkyl, or (viii) an optionally substituted 3 to 7 membered hetero ring, or R^{2a} and R^{3a} are taken together with the nitrogen atom to form a 3 to 7 membered hetero ring which may be substituted or the formula [3]:

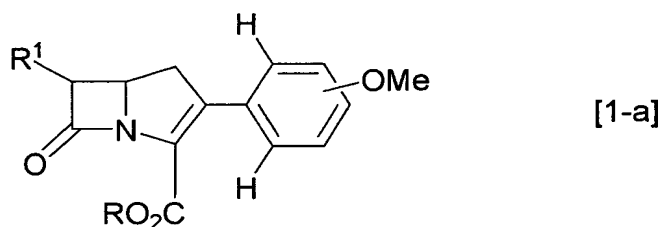


wherein m is an integer of 0 or 1, R^{3b} is hydrogen atom, optionally substituted C₁-C₆ alkyl, optionally substituted C₃-C₇ cycloalkyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted aralkyl, optionally substituted heteroarylalkyl, or an optionally substituted 3 to 7 membered hetero ring, and when m is 1, R^{3b} may further mean a

group which reproduces carbonyl group by hydrolysis in vivo, provided that when t is 0 and m is 1, R^{3b} is other group than hydrogen atom, and Y^2 is C_1 - C_4 alkyl, C_1 - C_4 alkoxy, halogen atom, cyano or $-NR^4R^5$ (in which R^4 and R^5 are independently

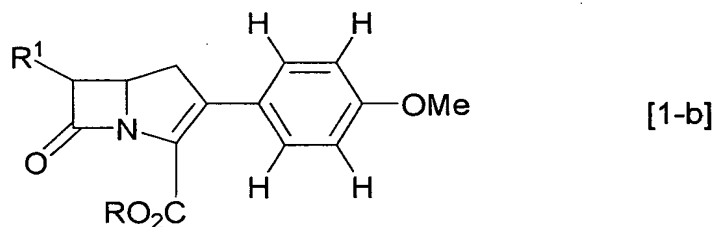
(i) hydrogen atom, (ii) a protective group of amino group, (iii) optionally substituted C_1 - C_6 alkyl, (iv) optionally substituted C_3 - C_7 cycloalkyl, (v) formyl, (vi) C_2 - C_7 alkylcarbonyl, (vii) optionally substituted aryl, (viii) optionally substituted heteroaryl, (ix) optionally substituted aralkyl, (x) optionally substituted heteroarylalkyl, or (xi) an optionally substituted 3 to 7 membered hetero ring, or R^4 and R^5 are taken together with the nitrogen atom to form pyrrolidine, piperidine or azepam), or a pharmaceutically acceptable salt thereof.

2. A carbapenem compound or a pharmaceutically acceptable salt thereof represented by the following formula [1-a] wherein G is G1 in the above formula [1]:



wherein R^1 and R are the same as defined in claim 1, or a pharmaceutically acceptable salt thereof.

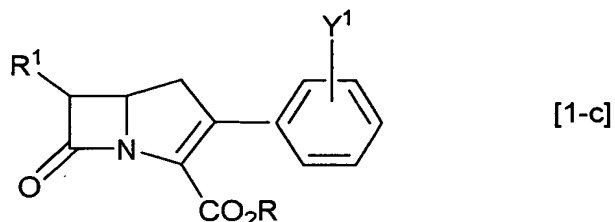
3. A carbapenem compound represented by the following formula [1-b]:



wherein R^1 and R are the same as defined in claim 1,

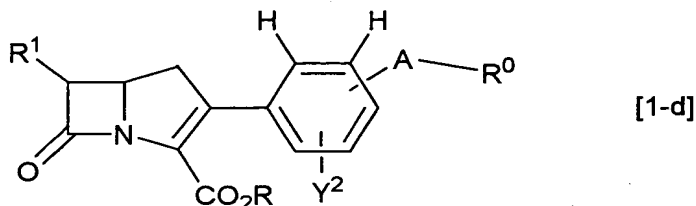
or a pharmaceutically acceptable salt thereof.

4. A carbapenem compound represented by the following formula [1-c]:



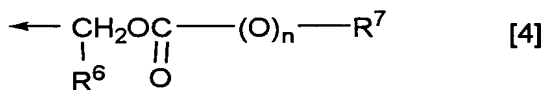
- 5 wherein R¹, R and Y¹ are the same as defined in claim 1, or a pharmaceutically acceptable salt thereof.

5. A carbapenem compound or a pharmaceutically acceptable salt thereof represented by the following formula [1-d]:



- 10 wherein R¹, R, A, R⁰ and Y² are the same as defined in claim 1, or a pharmaceutically acceptable salt thereof.

6. The carbapenem compound claimed in any one of claims 1 to 5 or a pharmaceutically acceptable salt thereof wherein a group which reproduces carboxyl group by hydrolysis in vivo is a group of the formula [4]:



wherein R⁶ is hydrogen atom or C₁-C₆ alkyl, R⁷ is optionally substituted C₁-C₁₀ alkyl, or optionally substituted C₃-C₁₀ cycloalkyl, and n is an integer of 0 or 1.

- 20 7. The carbapenem compound claimed in any one of claims 1 to 5 or a pharmaceutically acceptable salt thereof wherein R is a group of the formula [4] claimed in claim 4.

8. The carbapenem compound claimed in any one of claims 1 to 7 or a pharmaceutically acceptable salt thereof wherein R^1 is 1-hydroxyethyl.

9. The carbapenem compound claimed in any one of claims 1 to 5 or a pharmaceutically acceptable salt thereof wherein R is pivaloyloxymethyl, acetyloxymethyl, acetyloxy-1-ethyl, isopropylloxycarbonyloxy-1-ethyl or cyclohexylloxycarbonyloxy-1-ethyl.

10. The carbapenem compound claimed in any one of claims 1 to 5 or a pharmaceutically acceptable salt thereof wherein R is pivaloyloxymethyl.

11. The carbapenem compound claimed in any one of claims 1 to 5 or a pharmaceutically acceptable salt thereof wherein R is phthalidyl or (5-methyl-2-oxo-1,3-dioxol-4-yl)methyl.

12. The carbapenem compound claimed in any one of claims 1 to 5 or a pharmaceutically acceptable salt thereof wherein R is hydrogen atom.

13. The carbapenem compound claimed in claim 4 or a pharmaceutically acceptable salt thereof wherein Y^1 is C_2-C_4 alkoxy, $-(CH_2)_{ma}-O-CH_3$ (in which ma is the same as defined in claim 1) or $-O-(CH_2)_{ma}-O-(CH_2)_{mb}-CH_3$ (in which ma and mb are the same as defined in claim 1).

14. The carbapenem compound claimed in claim 4 or a pharmaceutically acceptable salt thereof wherein Y^1 is C_1-C_4 alkyl, trifluoromethoxy, halogen atom or cyano.

15. The carbapenem compound claimed in claim 4 or a pharmaceutically acceptable salt thereof wherein Y^1 is $-SO_2NR^2R^3$ (in which R^2 and R^3 are the same as defined in claim 1).

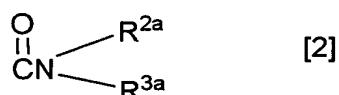
16. The carbapenem compound claimed in claim 4 or a pharmaceutically acceptable salt thereof wherein Y^1 is ethoxy, $-CH_2-O-CH_3$, $-(CH_2)_2-O-CH_3$ or $-O-(CH_2)_2-O-CH_3$.

17. The carbapenem compound claimed in any one of claims 4, 13 to 16 or a pharmaceutically acceptable salt thereof wherein Y^1 on benzene ring is meta or para to the binding position of 7-oxo-1-

azabicyclo[3.2.0]hept-2-ene.

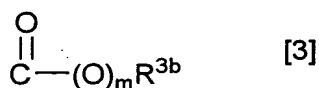
18. The carbapenem compound claimed in any one of claims 4, 13 to 16 or a pharmaceutically acceptable salt thereof wherein Y¹ on benzene ring is para to the binding position of 7-oxo-1-azabicyclo[3.2.0]hept-2-ene.

5 19. The carbapenem compound claimed in claim 5 or a pharmaceutically acceptable salt thereof wherein R⁰ is a formula [2]:



wherein R^{2a} and R^{3a} are the same as defined in claim 1.

10 20. The carbapenem compound claimed in claim 5 or a pharmaceutically acceptable salt thereof, wherein R⁰ is a formula [3]:



wherein m and R^{3b} are the same as defined in claim 1.

21. The carbapenem compound claimed in claim 5 or a pharmaceutically acceptable salt thereof wherein Y² is C₁-C₄ alkyl.

15 22. The carbapenem compound claimed in claim 5 or a pharmaceutically acceptable salt thereof wherein Y² is C₁-C₄ alkoxy.

23. The carbapenem compound claimed in claim 5 or a pharmaceutically acceptable salt thereof wherein Y² is halogen atom or cyano.

20 24. The carbapenem compound claimed in claim 5 or a pharmaceutically acceptable salt thereof wherein Y² is -NR⁴R⁵ (in which R⁴ and R⁵ are the same as defined in claim 1.

25 25. A medicament containing a carbapenem compound claimed in any one of claims 1 to 24 or a pharmaceutically acceptable salt thereof as an active ingredient.

26. An antibacterial agent containing a carbapenem compound claimed in any one of claims 1 to 24 or a pharmaceutically acceptable salt thereof as an active ingredient.

27. An oral medicament containing a carbapenem compound claimed in any one of claims 1 to 24 or a pharmaceutically acceptable salt thereof as an active ingredient.

5 28. An oral antibacterial agent containing a carbapenem compound claimed in any one of claims 1 to 24 or a pharmaceutically acceptable salt thereof as an active ingredient.